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Mikolajczyk et al.(10) **Pub. No.: US 2021/0099805 A1**(43) **Pub. Date: Apr. 1, 2021**(54) **DUAL FUNCTION TRANSDUCER**(71) Applicant: **Apple Inc.**, Cupertino, CA (US)(72) Inventors: **Rebecca J. Mikolajczyk**, San Jose, CA (US); **Onur I. Ilkorur**, Campbell, CA (US); **David S. Wilkes, JR.**, San Jose, CA (US); **Christopher Wilk**, Los Gatos, CA (US); **Michael J. Newman**, Cupertino, CA (US)(21) Appl. No.: **16/586,218**(22) Filed: **Sep. 27, 2019****Publication Classification**(51) **Int. Cl.**
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(57)

ABSTRACT

A transducer assembly comprising: a magnet motor assembly comprising a first magnet plate and a second magnet plate arranged along an axis, a first support plate positioned between inward facing surfaces of the first magnet plate and the second magnet plate, a second support plate positioned along an outward facing surface of the first magnet plate to form a first magnetic gap between the first support plate and the second support plate, and a third support plate positioned along an outward facing surface of the second magnet plate to form a second magnetic gap between the first support plate and the third support plate; a voice coil coupled to the magnet motor assembly, wherein the voice coil is positioned around the first support plate and within the first magnetic gap and the second magnetic gap; and a piston coupled to the voice coil, wherein the piston is operable to vibrate in a direction parallel to the axis.

